DEFENSE NUCLEAR AGENCY

COMMANDERS DIGEST

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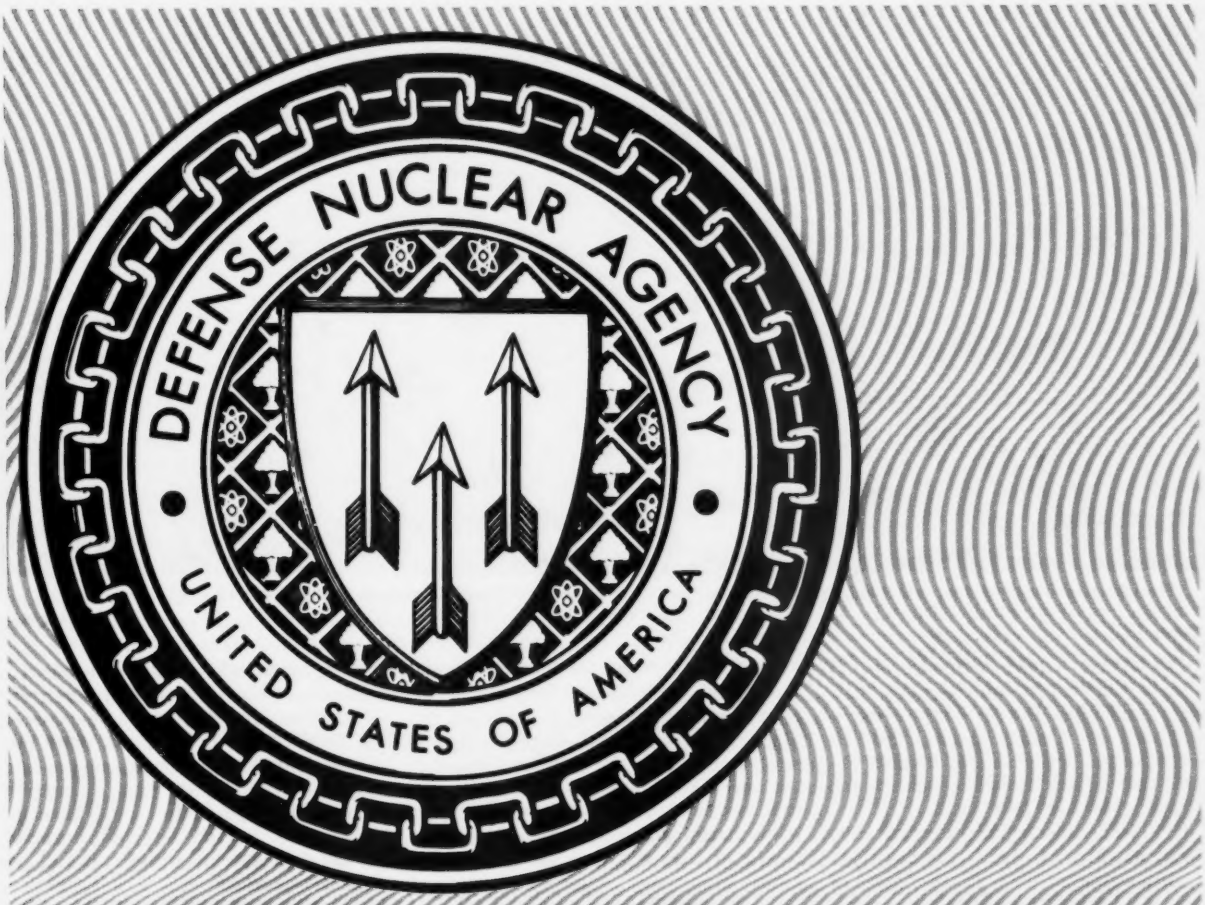

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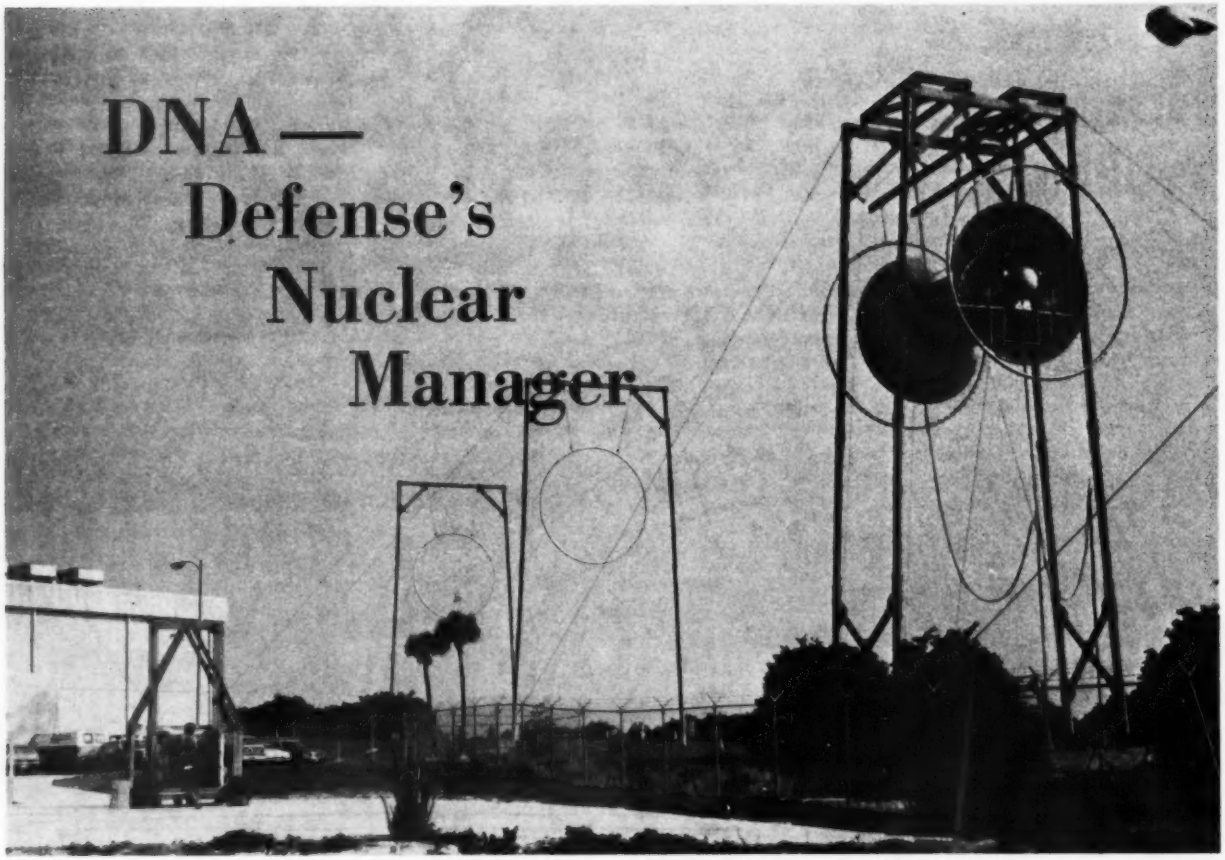
DNA — Defense's Nuclear Manager



Florida site used to test electromagnetic pulses on the Automatic Voice Network (AUTOVON) switching center. (DoD Photo)

The atomic bombs of World War II brought the war to an awesome, dramatic conclusion. The two nuclear bombs established the United States as the first world nuclear power and, in a sense, signaled that an age shaped by science and technology already had begun.

U.S. leadership in the age of technology nowhere has been more thoroughly demonstrated than in the area of defense. Defense needs, more critical since September 1949 when the Union of Soviet Socialist Republics detonated its first nuclear device, have served to spur the growth of U.S. technological knowledge and capability. Increasingly effective, increasingly complex weapons, aircraft, ships, vehicles and communication systems have been produced through research and development sponsored both jointly and separately by the Department of Defense and the Military Services.

Until the Military Services established individual capabilities to deal with nuclear weapons technology, much of the Department of Defense effort in this area was focused by the Defense Nuclear Agency (DNA) and its predecessor organizations. Training, logistics, stockpile management and proof and operational testing of warheads were DNA responsibilities in company with its role in nuclear research and development.

Reorganized most recently in 1971, the Agency, in recognition of the growing nuclear operational capabilities of the Services, has assumed a more technical and managerial character.

Mission And Organization

Under the general terms of the mission statement contained in its charter, the Defense Nuclear Agency provides staff support, advice and assistance in nuclear weapons matters to the Secretary of Defense, the Military Departments, the Joint Chiefs of Staff, and other Department of Defense (DoD) components. Specifically, the Agency is responsible within DoD for consolidated management of the nuclear weapons stockpile, the development and maintenance of the National Nuclear Test Readiness Program, and management of DoD nuclear weapons testing and effects research programs.

The DNA director reports to the Joint Chiefs of Staff who exercise primary staff supervision over Agency military operational functions. These include composition of the nuclear stockpile, military participation in and support of weapons testing, conduct of technical standardization inspections, and preparation and publication of technical documents.

ACTIVATION ANALYSIS—Army Captain George W. Donaldson performs activation analysis on cell samples by employing a pneumatic transfer system of the Armed Forces Radiobiology Research Institute. (DoD Photo)

The Director of Defense Research and Engineering exercises staff supervision over those DNA efforts associated with nuclear testing and weapons effects research programs. The Assistant to the Secretary of Defense (Atomic Energy) oversees a wide range of DNA activities including nuclear safety, weapons stockpile, transmittal of information to the Joint Committee on Atomic Energy of the Congress, and agreements between the DoD and the Atomic Energy Commission (AEC) on nuclear matters. As Chairman of the Military Liaison Committee, this Assistant (Atomic Energy) also exercises staff supervision of DNA support efforts on behalf of the committee.

The organization of DNA, as prescribed by its charter, includes a Director, a Deputy Director for Operations and Administration (DDOA), a Deputy Director for Science and Technology (DDST), a headquarters establishment, and such subordinate units, field activities, and facilities as are established by the Director or are assigned to the Agency by the Secretary of Defense.

DNA's headquarters element, just recently relocated to Fairfax County, Virginia, three miles south of Alexandria, is divided for functional and management purposes into two major areas of activity under the DDOA and the DDST. Directorates reporting to the DDOA include Personnel and Administration, Intelligence and Security, Operations, Logistics, and Plans and Programs. The DDST directorates are Shock Physics, Radiation, Vulnerability, and Analysis and Programs. The headquarters also includes six separate offices reporting to the Director through a Chief of Staff: Comptroller, Inspector General, Judge Advocate, Public Affairs, Civilian Personnel Management, and Joint Atomic Information Exchange Group.

Major subordinate units of DNA are the Field Command, located at Kirtland Air Force Base, New Mexico, and the Armed Forces Radiobiology Research Institute at Bethesda, Maryland. Other DNA units are located at Livermore and Santa Barbara, California; Los Alamos, New Mexico; the AEC Nevada Test Site near Las Vegas; and Johnston Atoll in the Pacific Ocean.

Stockpile Management

Under its stockpile management responsibilities, DNA maintains a continuous accounting record of the location, condition, and readiness for use of every nuclear weapon in DoD custody. In addition, the Agency provides guidance, coordination, advice, and assistance on production, composition, deployment, movement, storage, maintenance, quality assurance and reliability assessment, reporting procedures, and retirement of nuclear weapons. It also furnishes the Services with technical information and advice in connection with the construction and operation of weapon storage sites.

DNA conducts technical standardization inspections of all units of the Military Services which have responsibilities for assembling, maintaining or storing nuclear weapons. DNA inspectors insure the security of weapons and the technical proficiency of the personnel who have custody of them. Such inspections, performed by teams operating out of the Field Command, assure compliance with regulations promulgated by DoD and the Joint Chiefs of Staff.

The Agency participates actively in the DoD nuclear weapons system safety program. In conjunction with the AEC, DNA operates the Joint Nuclear Accident Coordinating Center (JNACC), a centralized agency through which information on radiological assistance capabilities is exchanged and maintained. JNACC, when called upon, coordinates assistance activities connected with accidents involving radiological materials. DNA also provides the principal DoD

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representative on the Interagency Committee on Radiological Assistance.

In the area of nuclear weapons safety, an important contribution by DNA is its unique capability to serve as an independent and impartial auditor of rules and regulations. In the process of developing and reviewing such rules for each weapon system, both the cumulative experience and the joint service character of DNA expertise assure that safety and security requirements take precedence over operational expediency.

Nuclear Test Readiness

In October 1963, the United States, Great Britain, and the Union of Soviet Socialist Republics, as major nuclear powers, became signatories along with more than 100 other nations to a Limited Test Ban Treaty. The treaty banned test detonations of nuclear weapons under water, in the atmosphere, or in outer space. Although it did not prohibit underground testing, the treaty specified that such tests may not cause radioactive debris to be present outside the territorial limits of the nation conducting the tests.

Before consenting to ratification of the Limited Test Ban Treaty, the United States Senate required assurances that it would not impair national security. Those assurances took the form of four safeguards recommended by the Joint Chiefs of Staff:

- Continuing underground nuclear test programs will be conducted in order to add to our knowledge and improve our weapons;
- Modern nuclear laboratory facilities and programs will be maintained to insure continued application of our human scientific resources;
- The facilities and resources to conduct testing will be maintained in a state of readiness for resumption should our national security interests dictate the necessity; and
- Our capability to monitor the terms of the treaty, detect violations, and increase our knowledge of foreign nuclear capabilities will be maintained.

The third treaty safeguard is the basis for DNA's readiness-to-test mission and for the joint DNA-AEC development and maintenance of the National Nuclear Test Readiness Program. Should national security require the resumption of nuclear testing in currently prohibited environments, a currently inactive Agency element, Joint Task Force Eight, would be responsible for conducting such tests.

Current emphasis in this area is given to maintenance of test support facilities located on Johnston Atoll, some 800 miles southwest of Hawaii. The atoll served as a base for nuclear test operations conducted by the United States prior to signing the Test Ban Treaty. Following ratification of the treaty, its facilities for surveillance, weather, and aircraft were improved. To support high altitude testing, rocket launch pads and assembly areas were prepared along with facilities for instrumented ships and aircraft.

The readiness program must consider reaction time—how long it will take to get actual operations underway for DoD nuclear operational systems tests; tactical exercises; weapons effects and phenomenology tests; and AEC nuclear device development, weapon proof, weapon output, and safety tests. In preparing plans for such potential operations, the

TOP QUALITY—Biomedical technician June Egan performs chemical laboratory testing to insure high quality models for ionizing radiation research. (DoD Photo)

Looking into tunnel at the Nevada test site in preparation for underground test. (DoD Photo)

time requirements for safety and environmental impact studies, procurement of range clearances, and preparations for a substantial quantity of data-gathering instrumentation are important considerations.

In the continuous process of updating readiness plans, attention also must be given to deciding which tests are required. As the DNA underground effects test program, laboratory efforts and simulation projects produce more information, requirements for certain nuclear tests may be eliminated or modified. Because funding for the maintenance of constant readiness to conduct all desired tests is not feasible, selectivity and sound judgment are important elements in the continuing revision of readiness plans.

Nuclear Weapons Effect Research And Testing

The continuing major objective of DNA's nuclear weapons research and test program is the provision of a sound technical base capable of assuring optimum effectiveness of U. S. military systems even in the environment created by an enemy nuclear attack. New systems present new and increasingly complex effects problems. Advances in nuclear technology introduce both new threats and new opportunities to strengthen U. S. defense forces. Directed toward providing the Services with data which can be used to insure that U. S. strategic missiles, satellites, and command, control and communications systems can be built to survive enemy nuclear assaults, DNA research results in the full definition of nuclear effects and data for use in negating those effects.

DNA's program, therefore, involves development of techniques to predict the environment produced by nuclear detonations, assessment of the response of systems and materials to that environment, development of technology to increase the ability of systems and materials to withstand the nuclear environment, and testing to confirm the effectiveness of hardening measures. Since consideration of potential military employment of nuclear weapons is vital to such a program, DNA technical personnel work with tactical and strategic planners in developing ways to use such weapons most effectively.

To reach its research and test objectives, the Agency relies on theoretical analysis, laboratory experimentation, and underground nuclear tests. Major attention is given to the development of computer codes through which data gained in laboratory experiments and field testing can be utilized by the Services to predict the nuclear environment and to assess material responses.

Underground testing, conducted at the AEC Nevada Test Site, is employed by DNA to study shock, thermal, and nuclear radiation effects on military hardware. On occasion, such tests are used to develop data on the functional capability of a nuclear weapon in the environment created by detonation of another nuclear charge. Most current testing takes place in horizontal tunnels drilled into a mountainside. This configuration both facilitates the positioning and recovery of instrumentation and material and reduces the likelihood of accidental release of radioactive material into the atmosphere.

Increasingly, however, DNA has turned to laboratory work and simulation techniques where possible in developing nuclear weapons effects data. It has been demonstrated that many such effects can be simulated under laboratory conditions using scale models of military systems. Laboratory simulators not only complement underground tests but also can provide data on some elements of the nuclear environment that cannot be produced underground.

Electromagnetic pulse (EMP), a phenomenon common to both high altitude nuclear bursts and thunderstorms, is one such element. In essence, EMP is a burst of electromagnetic energy that creates a high frequency electrical field. Extremely transitory, lasting for no more than a few thousandths of a second, this electrical energy can be picked up by any metal conductor withing range of the field. Depending upon their efficiency as receiving antennae, missiles in flight, powerlines, etc. will absorb some of the energy. Passed along to electrical components of the system, the energy can produce adverse secondary effects.

DNA has established a number of EMP simulation laboratories for operation by the Services. Some of the research conducted by these laboratories is DNA-sponsored while other work is sponsored by the using Service.

The first such simulator is the ARES facility constructed at Kirtland Air Force Base, New Mexico, which is used to study EMP effects on missiles. A second simulator, developed by the Army under DNA sponsorship, is transportable for use in testing communications facilities and other large, permanent installations. This latter facility, called TEMPS (Transportable EMP Simulator), currently is located in Florida and is being employed in testing an Automatic Voice Network (AUTOVON) switching center. Operating under a five-year program, TEMPS will later be relocated for studies at other military structures within the continental United States.

DNA also has funded for laboratory simulators oriented to other nuclear weapons effects. AURORA, operated by the Army's Harry Diamond Laboratories, White Oak, Maryland, is used to investigate ionization effects. CASINO, located at the Naval Ordnance Laboratory, also at White Oak, is a laboratory for X-ray effects studies.

The biomedical aspects of ionizing radiation is still another effects area in which laboratory research can be conducted successfully. A continuing program of research in experimental pathology, behavioral science, physical sciences, and radiation biology is carried on at the Armed Forces Radiobiology Research Institute (AFRRI), a DNA subordinate element located at Bethesda, Maryland. The Institute's TRIGA reactor has an exposure capability specifically designed for biological research. It can produce extremely large amounts of radiation in a fraction of a second, simulating in a controlled environment the levels associated with nuclear explosions.

DNA scientists also have turned to natural phenomena in gathering data applicable to nuclear weapons effects research. During an eclipse of the sun some years ago, DNA experiments gathered data used to solve ionospheric communications problems. More recently, such employment of natural occurrences involved the aurora borealis.

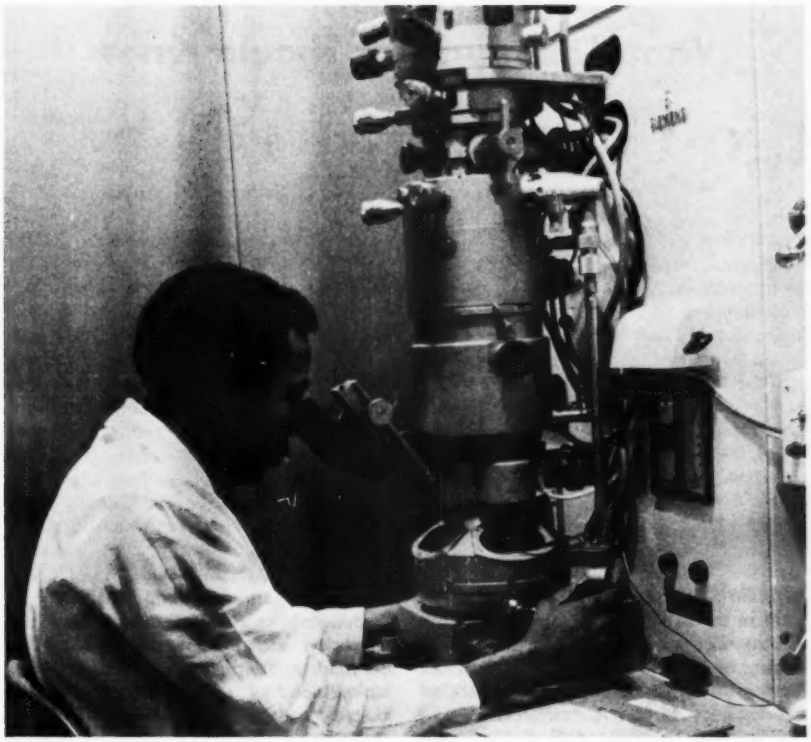
In March 1973, rocket-borne instrumentation packages were launched at the Poker Flat Research Facility near Fairbanks, Alaska. The firings were directed toward active, visible aurorae to measure infrared emissions, production sources, composition, ionization, and visible emissions. Measurements of density and winds also were obtained. Through this program, geophysical information was obtained for application to the forming of predictive computer codes needed to assess and evaluate the operation of critical radar and optical systems in nuclear-disturbed environments.

Simulation of the blast and shock wave

About DNA

What Commanders Should Know

- DNA is a joint Service organization engaged primarily in managing the nuclear weapons stockpile, conducting nuclear weapons effects research and maintaining readiness facilities to be used if national interests dictate resumption of currently prohibited nuclear weapons tests.
- The DNA Director reports to the Joint Chiefs of Staff and to the Secretary of Defense.
- The DNA nuclear effects research program involves development of techniques to predict the environment produced by nuclear explosions, assessment of the response of systems and materials to that environment, development of technology to increase the ability of systems and materials to withstand the nuclear environment and testing to confirm the effectiveness of hardening measures.
- Nuclear weapons functions developed by DNA will be transferred to the Services unless these functions have truly joint aspects or require extensive coordination.
- Although the Atomic Energy Commission is responsible for proof testing of nuclear weapons, DNA oversees DoD interests during the tests and provides support.
- Should the United States for any reason find it necessary to resume prohibited atmospheric testing of nuclear weapons, such activity would be conducted by a currently inactive DNA element, Joint Task Force Eight.
- The Joint Nuclear Accident Coordination Center (JNACC), operated by DNA in conjunction with the AEC, provides on request assistance in connection with any accidents involving radioactive materials.
- A considerable wealth of nuclear expertise is concentrated in the DNA staff and available, on request, for assistance, advice and support to the Military Services.
- DNA technical inspections of DoD nuclear-capable elements determines the proficiency of personnel, adequacy of security arrangements, and adherence to safety standards.
- DNA's most important contribution to nuclear safety is the capability to serve as an independent and impartial auditor of rules and regulations developed for new weapon systems.



CELLS—Technician Joe Parker observes cell structure through an electron microscope at the DNA's Experimental Pathology Department. (DoD Photo)

effects of a nuclear environment can be accomplished by employing non-nuclear explosives such as TNT. Since 1964, DNA has conducted a series of such tests using stacked spherical and hemispherical TNT charges, detonable gas-filled balloons, and stacked bags of an ammonium nitrate/fuel mixture.

Geology, as well as variety of explosives, has figured prominently in the test considerations of this program. Tests in Canada, Hawaii, Utah, Nevada, Colorado, and Louisiana have been conducted on granite, alluvial soil, volcanic ash, clay, shale and playa. A recent test conducted near Grand Junction, Colorado, utilized a geological base of sand over sandstone for detonation of a 500-ton spherical stack of TNT.

During the Grand Junction test, more than 40 separate experiments depended on the explosion which simulated a one-kiloton nuclear burst. Military equipment such as artillery pieces, missile bodies, ground vehicles and aircraft were exposed to blast, shock and thermal waves of varying intensity. Shelters for personnel and aircraft and other structures were subjected to the same effects. Experiments were below ground level, at the surface and suspended above ground level at a variety of distances from Ground Zero.

Future tests in the program will utilize other ground substances as bases for experimentation to enlarge the body of technical knowledge available to military developers. The detonations produce, in addition to data previously listed, information on cratering ejecta and tree blowdown. Many of them have been the result of quadripartite participation by the United States, the United Kingdom, Canada, and Australia.

Other Agency Activities

From the numerous research activities in which DNA is engaged are prepared a substantial number of technical documents which are made available to those segments of the military and civilian scientific communities oriented to defense developments. The Agency also coordinates and directs technical analyses and studies of specific nuclear-related problems, preparing technical publications and implementing directives when appropriate.

Members of the DNA staff develop information on nuclear weapons development and on the progress of associated technology, analyze the needs of the Services and the Unified and Specified Commands for warhead development, and recommend development priorities to the JCS.

In addition, DNA military and civilian scientists participate in the technological dialogue of the international scientific community in the interests of exchanging information to strengthen the Free World defense posture.

The Joint Atomic Information Exchange Group (JAIEG), a DNA Headquarters element, represents the DoD and the AEC with respect to international transmittal and receipt of nuclear information. The unit reviews all proposals by United States agencies for exchanging such information, authorizes transmittal based on law and executive decisions, and maintains records of all nuclear information sent or received.

During the past, the Agency was actively involved in the overseas nuclear weapons test programs conducted at Bikini and Eniwetok. Fittingly, the Agency was assigned the task of cleaning up the residue of the Bikini tests in preparation for return of the islands to their former inhabitants. DNA also has been assigned similar responsibility with regard to planning for clean-up of Eniwetok. This past December, a DNA engineering survey team completed its work on Eniwetok so that a military clean-up operation can begin there.

Summary

The Defense Nuclear Agency, operating with full respect to the traditions of United States military service, fulfills a vital defense mission that is uniquely contemporary. By contributing to the technology that is an important element of U.S. defensive strength, the Agency functions as a full partner to the Military Services in the area of nuclear readiness.

Established in 1947

Atomic Age Ushered in DNA

In 1972, the Defense Nuclear Agency (DNA) observed its 25th anniversary. Established January 1, 1947, by joint directive of the Secretaries of War and Navy, the Agency originally was designated the Armed Forces Special Weapons Project (AFSWP). It derived from the Manhattan Engineer District, the Army Corps of Engineers element through which the first atomic bombs were developed during and immediately following World War II.

The Atomic Energy Act of 1946 placed national responsibility for atomic energy development under civilian control. It established the Atomic Energy Commission (AEC) which assumed the functions, organization and properties of the Manhattan Engineer District. Certain functions dealing with military applications of atomic energy, however, were retained by the War Department under agreement with the AEC. AFSWP was created to discharge those functions.

The Atomic Energy Act of 1946 also established a Military Liaison Committee as a means to coordinate military requirements with the AEC development program. AFSWP provided support to the committee.

DNA, known from 1947 until 1959 as AFSWP and from 1959 to 1971 as the Defense Atomic Support Agency (DASA), is the oldest joint service organization in the Department of Defense (DoD). The Agency, in fact, is older than the DoD itself. Its first charter, a memorandum signed by General of the Army Dwight D. Eisenhower, Chief of Staff, United States Army, and Admiral of the Fleet Chester W. Nimitz, Chief of Naval Operations, provided for joint participation by the Army, Navy and "Army Air Force," the last named specifically in view of its "present relatively autonomous position" and "legislation now before the Congress." This referenced legislation became the National Security Act of 1947 and created not only the U. S. Air Force as a separate Service but also founded the National Military Establishment (now DoD) headed by a Secretary of Defense.

Under its original charter, the Agency was assigned a very broadly stated mission: to discharge all Military Service functions relating to atomic energy.

Major General Leslie R. Groves, USA, commander of the wartime Manhattan Engineer District was named first Chief, AFSWP. His deputy was Rear Admiral William S. Parsons, USN, also a participant in the Manhattan Project and bomb commander aboard the "Enola Gay" during the atomic bombing of Hiroshima. Both officers already were members of the Military Liaison Committee.

The staff, military and civilian personnel drawn from the War and Navy Departments, included members of the Armed Forces exempted from service with the AEC and still on duty with the Manhattan District at midnight December 31, 1946. Members of that original AFSWP staff, familiar with the Trinity test shot at Alamogordo, New Mexico, in July 1945 and with the weapons used against Japan, also had participated in Crossroads, the first overseas atomic weapons tests conducted at Bikini during June and July of 1946.

The new agency established training facilities and undertook the coaching of weapons assembly teams. It prepared assemblage and stockpile facilities. Its responsibilities also included military participation in weapons development (in coordination with the AEC), storage and surveillance of atomic weapons in the custody of the Armed Forces, and the development and establishment of joint radiological safety measures.

EXPERIMENT—An Armed Forces Radiobiology Research Institute staff team prepares to begin a radiation experiment.

Aerial view of the DNA Pacific site at Johnston Atoll. **(DoD Photo)**

In December 1948, AFSWP was assigned coordinating responsibility for the DoD program for offensive radiological warfare. Six months later, it was directed to conduct free air pressure measurements during the Greenhouse operations at Eniwetok. In July 1949, the Agency was given responsibility for collecting, reviewing and disseminating data pertaining to the military effects of atomic weapons. It became responsible for preparing preliminary plans and budgeting for the military phases of atomic weapons tests that would follow Greenhouse. This responsibility was further expanded in January 1952 to include technical direction of weapons effects tests and coordination of military participation and support of the AEC in conducting weapons tests. Similar responsibilities with regard to overseas testing were assigned to the Agency in April 1953.

By 1952, Agency personnel strength had increased to more than 11,000. It operated, however, under a philosophy designed to transfer functions to the Military Services as soon as the Services were capable of discharging them. The Agency, still operating under that same philosophy, retains only those activities that have truly joint aspects or require extensive coordination. Its personnel strength today is just over 1,300.

In 1956, the Agency was designated the DoD receiving and distributing point for the exchange of atomic information with the United Kingdom. Following enactment in July 1958 of an amendment to the Atomic Energy Act permitting greater latitude in exchanging such information, the Secretary of Defense established within the Agency the Joint Atomic Information Exchange Group (JAIEG) to handle transfers of atomic information to and from foreign countries. Originally operating as a separate headquarters headed by a Deputy Chief of the Agency, JAIEG subsequently was absorbed as a separate office of DNA Headquarters.

The Defense Reorganization Act of 1958 had a considerable effect on the status of the Agency. Under a new charter dated May 1, 1959, the Agency was redesignated DASA. Whereas AFSWP had been an interdepartmental organization with its Chief reporting to the individual Service heads, DASA was established under the responsibility of the Secretary of Defense. Its Chief, as head of a Defense Agency, reported to the Secretary through the Joint Chiefs of Staff. A subsequent charter issued in 1964 retitled the Agency head "Director" and assigned responsibility for the Armed Forces Radiobiology Research Institute.

Nuclear testing in the atmosphere was suspended by the United States in October 1958 under a moratorium observed by the existing nuclear powers. The Soviet Union abrogated the moratorium by renewing such tests in September 1961. The United States thereupon initiated its own above-surface Dominic series of nuclear weapons tests. Dominic was conducted in the Pacific Ocean Test Area during 1962 by Joint Task Force Eight, a subordinate DASA element.

The 1962 Dominic series represented the last above-surface nuclear weapons tests conducted by the United States. Negotiators between this Nation, the United Kingdom, and the Union of Soviet Socialist Republics concluded preparation of a Limited Nuclear Test Ban Treaty to which they and more than a hundred other nations became signatories. The U. S. Senate ratified the treaty in October 1963. Subsequent nuclear testing, except by France and the Peoples Republic of China, nonsignatories to the treaty, has taken place underground.

DASA became the Defense Nuclear Agency on July 1, 1971. Its charter, dated November 3, 1971, prescribes its mission, organization, and responsibilities.

Q & A About Defense Nuclear Agency

Army Lt. Gen. C. H. Dunn

Army Lieutenant General Carroll H. Dunn has been the Director of the Defense Nuclear Agency since July 1971. A native of Arkansas, he received his higher education at the University of Illinois where he was graduated as a mechanical engineer in 1938.

In World War II, he served as a combat engineer with the 30th Infantry Division from Omaha Beach to Magdeburg, Germany.

The postwar years found him in a variety of engineering assignments from Japan to Washington to Greenland. During the early 1960s he was deeply involved in the construction of this Nation's intercontinental ballistic missile sites.

General Dunn served in Vietnam from February 1966 to October 1967 as the Director of Construction for MACV.

In the following interview with **Commanders Digest,** the general outlined the organizational and operational workings of this little known but vital Department of Defense Agency.

* * * * *

Commanders Digest: Does the unique character of the DNA mission create unique operational requirements?

Gen. Dunn: *Yes, but to clarify the matter, let's compare the Agency's operational character to that of a civilian commercial enterprise. Commerce deals in goods and services. So does DNA, even though, like many parts of DoD, the Agency is primarily a service enterprise. One of the services DNA provides the Defense establishment is a product—scientific and technical data in the area of nuclear weapons effect. Therefore, DNA's operating structure must provide for the management of both production and service activities.*

CD: You have identified the product. What about the services you mentioned?

Gen. Dunn: *DNA manages the DoD stockpile of nuclear weapons and provides an inspection system to assure that people manning our nuclear-capable units are properly trained to maintain and use the weapons. DNA also verifies the security and readiness of the weap-*

DETERMINATIONS—Air Force Master Sergeant W. J. Canterbury performs serum calcium determinations by atomic absorptions spectroscopy. (DoD Photo)

ons themselves and makes certain that the full restraint system, based on Presidential approval before any weapon can be used, is known and in effect. Our management services in this area include keeping track of the location of every weapon, its condition and its readiness for use.

CD: That nails down DNA service in that area. Are there others?

Gen. Dunn: *DNA also maintains the facilities and resources the Nation requires to assure prompt resumption of currently prohibited testing, if our national security warrants such tests. We provide technical guidance on request to the Military Services and other DoD elements on any of their nuclear weapons problems.*

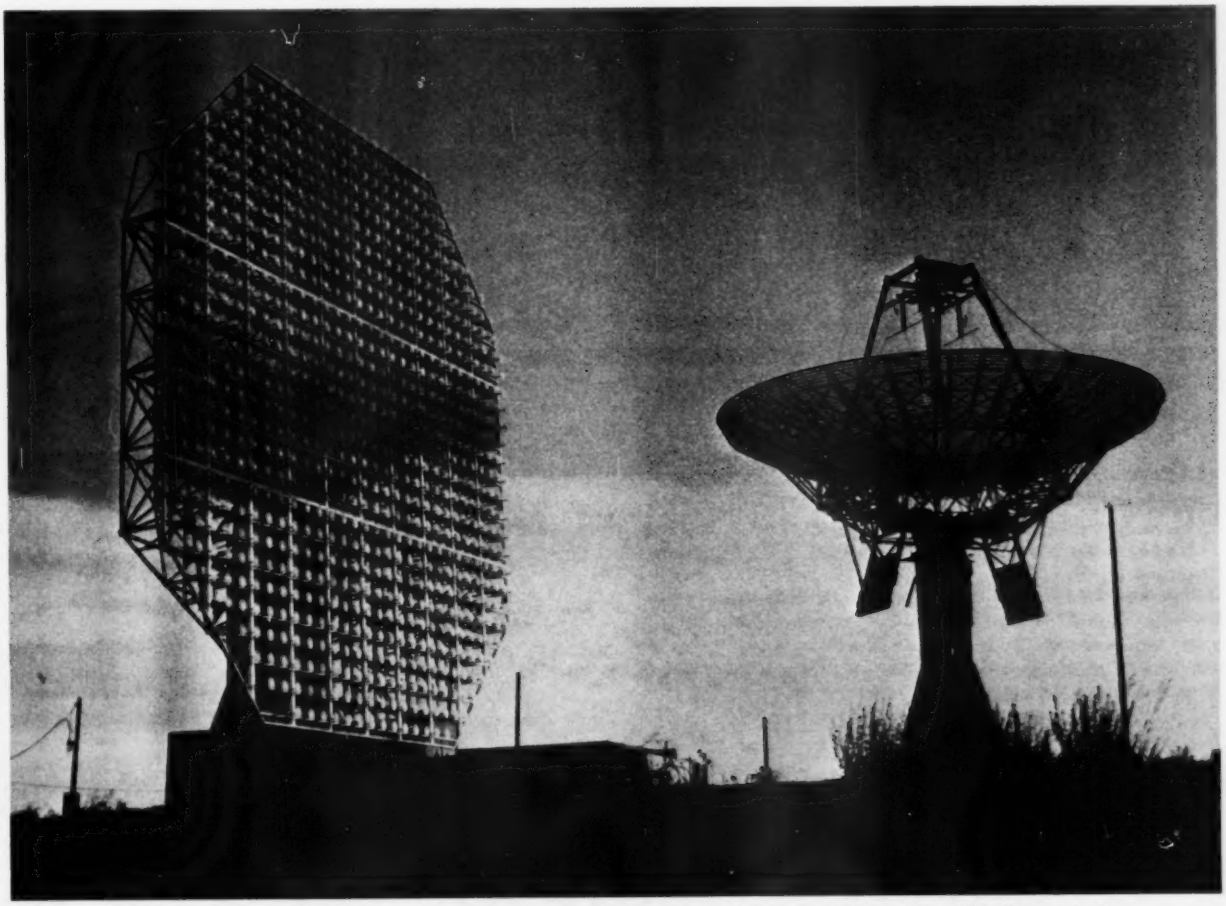
CD: What sort of organizational structure supports this product and service mission?

Gen. Dunn: *The organization solves the problem of a dual mission. It more or less is divided down the middle. On one side are operational and administrative activities, and on the other are the scientific and technical tasks. A Deputy Director oversees each of the two major functional areas. In addition, DNA Headquarters has six special staff offices that report to me through a Chief of Staff.*

CD: DNA is described as the oldest joint service organization in DoD. Is a balance maintained in representation by each of the Services?

Gen. Dunn: *My job as Director and those of the Deputy Director for Operations and Administration; Commander, Field Command; and Director, Armed Forces Radiobiology Research Institute (AFRRI) rotate among the Army, Navy and Air Force. In my job, for example, I was preceded by Vice Admiral L. M. Mustin, US Navy (Retired) as Director, and I assume I will be followed by an Air Force general officer. The position of Deputy Director for Science and Technology is held by a civilian scientist. Directorate heads include representatives of each of the Services as well as civilians.*

CD: Can you elaborate on the activities managed on the operations and administrative side of DNA?



The Auroral Clutter Mapping Radar at Homer, Alaska, is used in connection with rocket-borne tests.
(DoD Photo)

Gen. Dunn: *The Deputy Director for Operations and Administration supervises five directorates: Personnel and Administration, which handles military personnel actions, manpower management, office services such as records and mail, and audio-visual activities; Intelligence and Security; Operations, which has charge of managing stockpile data, technical operations, and communications; Logistics, which takes care of contracting, supplies and transportation; and Plans and Policy.*

CD: What about scientific and technical activities?

Gen. Dunn: *This, of course, covers our weapons test and weapons effects research activities carried out under management of four Headquarters directorates reporting to the Deputy Director for Science and Technology. The Shock Physics people are interested in blast and shock phenomena. Our Radiation Directorate gets into nuclear and thermal radiation effects. The Vulnerability Directorate works in the area of hardening and protecting military systems against nuclear attack. Analysis and Programs is the coordinating element for the overall scientific research program and evaluates and distributes resulting data. The Armed Forces Radiobiology Research Institute (AFRRI), one of our subordinate units, does research on biomedical effects.*

CD: Does this two-part structure create problems of communication and coordination?

Gen. Dunn: *Our DNA organization structure has been arranged to preclude such problems. The chain of command is clearly delineated; and, insofar as possible, our elements are identified by function. DNA is a small organization of just over 1,300 people. We have interarea staff meetings at regular intervals; and the Deputy Directors, directorate and separate office heads, and the Director of AFRRI meet with me at weekly staff conferences in addition to the daily contacts of routine operations. Field Command, our unit at Kirtland Air Force Base, New Mexico, is as close to the headquarters as a telephone call.*

CD: You indicated that AFRRI handles biomedical research. What are Field Command's responsibilities?

Gen. Dunn: *Field Command deals primarily with stockpile management and nuclear inspection responsibilities and with the field activities associated with nuclear weapons tests and weapons effects testing.*

CD: Can you give an example typical of the problems that come up in the ordinary course of DNA activity?

Gen. Dunn: *The first problem that comes to mind fortunately has been solved already. Much of our DNA business, in fact, has to do with problem solving in the area of nuclear weapons effects. One of those effects is EMP, electromagnetic pulse, which can play havoc with electronic equipment. DNA has funded for several laboratory facilities which simulate EMP for study into its effect on equipment such as missiles, computers, and the like. The EMP effect is equally hazardous with respect to communications systems, but you cannot bring a telephone switching center into a laboratory. The problem was solved by developing a transportable simulator that can be brought to the switching center or any other large, immovable system. DNA funded for its development by the Army's Harry Diamond Laboratories.*

CD: Are there any other unique problems connected with DNA's field tests?

Gen. Dunn: *Insofar as possible, we try to identify problem areas during the planning phases for our tests. In that way, many of the problems can be solved before they develop. In the case of Mixed Company, a 500-ton high explosive test conducted last November in Colorado, there were special problems that required just this sort of advance solution. Because of the magnitude of the explosion, we needed a fairly remote test area that was not so isolated as to create a problem of logistics. We also required a specific geological terrain for data purposes. The solution of these problems determined the choice of a sandstone site 18 miles from Grand Junction, Colorado, a city capable of serving as a logistics base. These are problems common to all such field operations. In addition, the effects of such tests on the environment must be considered very thoroughly before final site selection is made.*

COLLECTOR—Army Staff Sergeant Martin J. McNeely operates a fraction collector in the Hematology Group of the Armed Forces Radiobiology Research Institute. (DoD Photo)

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